3.0 Total Maximum Daily Loads for the Water Quality Limited Water Bodies of the Coeur d'Alene Lake and River Sub-basin (17010303)

3.1 Wolf Lodge Creek Watershed Total Maximum Daily Load

3.1.1 Introduction

Wolf Lodge Creek and its tributaries Marie and Cedar Creeks are listed as water quality limited on the 1998 section 303(d) CWA list. The sub-basin assessment (section 2.0) indicates that Wolf Lodge Creek is impaired by excess sedimentation. The model used estimated 237 tons/year above the background sedimentation rate. However, the sediment loading of streams in the northern Rocky Mountains is not continuous nor does it occur on a yearly basis. The majority of the sediment resident in the bed and affecting the beneficial uses is loaded in large discharge events which have a return period of 10 - 15 years. The model accounts for this fact by dividing mass failure and road encroachment sediment estimates by ten. Wolf Lodge Creek could possibly have 2,370 tons of sediment resident in its bed from the 1996 flood event. This amount added to any residual sediment from the 1974 and earlier flood events. Marie Creek is listed for habitat alteration. Habitat alteration is not a characteristic, which can realistically be addressed with a TMDL. A TMDL addressing the excess sedimentation of Wolf Lodge Creek will require that sediment loads from Marie and Cedar Creek as well as its other tributaries be addressed.

The Wolf Lodge Creek watershed has the ownership pattern outlined below:

Ownership	Acreage	Percentage
Federal	32,592	82
State	386	1
Private	6,742	17
Total	39,720	100

The land use pattern has the pattern outlined below:

Land Use	Acreage	Percentage
Forest Use		
USFS	32,592	82.1
State & Private	5,382	13.5
Agriculture & Residential Subdivision	1,746	4.4
Total	39,720	100.0

Stream frontage on agricultural bottom lands is divided as follows:

Stream Frontage Use	Footage	Percentage
Working ranch	25,872	48.5
Ranchette	27,456	51.5
Total	53,328	100.0

3.1.2 TMDL Authority

Section 303(d)(1) of the Clean Water Act requires states to prepare a list of waters not meeting state water quality standards in spite of technology based pollution control efforts and the application of best management practices for nonpoint sources. This list must include a priority ranking "... taking into account severity of the pollution and the uses to be made of such waters." The prescribed remedy for these water quality limited waters is for states to determine the total maximum daily load (TMDL) for pollutants "... at a level necessary to implement applicable water quality standards with seasonal variations and a margin of safety ..." A margin of safety is included to account for any lack of knowledge about how limiting pollutant loads will attain water quality.

Section 303(d)(2) requires both the list and any total maximum daily loads developed by the state be submitted to the Environmental Protection Agency (EPA). The EPA is given thirty days to either approve or disapprove the state's submission. If the EPA disapproves, the agency has another thirty days to develop a list or TMDL for the state. Both the list and all TMDLs, either approved or developed by EPA, are incorporated into the state's continuing planning process as required by section 303(e).

3.1.3 Loading Capacity

The load capacity for a TMDL designed to address a sediment caused limitation to water quality is complicated by the fact that the State's water quality standard is a narrative rather than quantitative standard. In the waters of the Wolf Lodge Creek watershed, the sediment interfering with the beneficial use (cold water biota) is most likely large bedload particles. Adequate quantitative measurements of the effect of excess sediment have not been developed. Given this difficulty a sediment loading capacity for the TMDL is more difficult to develop. This TMDL and its loading capacity is based on the following premises:

: natural background levels of sedimentation are assumed to be fully supportive of the beneficial uses, cold water biota.

: the stream system has some finite yet unquantified ability to process (attenuate through export and/or deposition) a sedimentation rate greater than background rates.

: the beneficial use (cold water biota) in-stream will be fully supported when the finite yet unquantified ability of the stream system to process (attenuate) sediment is met.

: care must be taken to control factors which may interfere (fish harvest) with the quantification of beneficial use support.

The natural background sedimentation rate from the Wolf Lodge Creek Watershed is 910 tons per year. (Background sediment yield = 39,553 acres x 0.023 tons/acre/yr). This calculation assumes the entire watershed would be vegetated by coniferous forest, if undisturbed. This value is the interim loading capacity.

3.1.4 Margin of Safety

The model employed to estimate sedimentation rates has several conservative assumptions, which are documented in Section 2.0, Appendix B. Applied to the Belt terrane of the Wolf Lodge watershed, the model provides an inherit margin of safety of 231%. This is a sufficient margin of safety.

3.1.5 Appropriate Measurements of Full Beneficial Use Support

Sediment load reduction from the current level towards the interim sediment reduction goal is expected to attain an as yet unquantified sediment load at which the beneficial use (cold water biota) will attain full support. This sediment load will be recognized by the following appropriate measures of full cold water biota support:

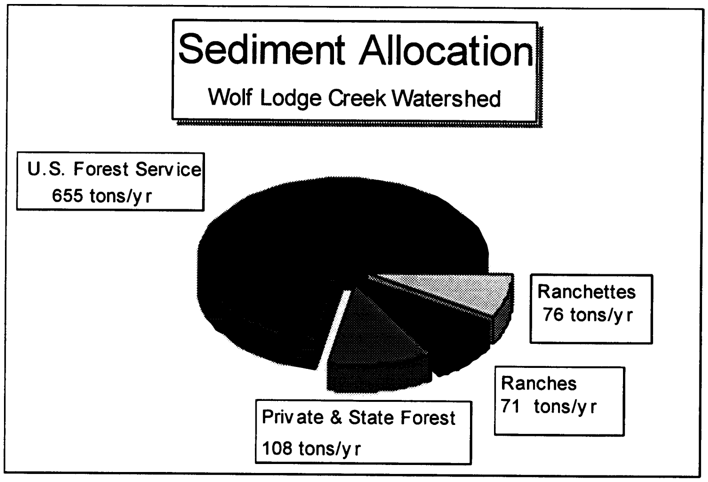
: three or more age classes of trout with one young of the year.
: trout density a reference levels (0.1-0.3 fish/yd^2/hour effort).
: presence of sculpin and tailed frogs.
: macro invertebrate biotic index score of 3.5 or greater.

When the appropriate sediment loading capacity is determined by these appropriate measures of full cold water biota support, the interim load capacity will be revised to the appropriate load capacity.

3.1.6 Sediment Load Allocation

The current estimate of the sediment load capacity of the watershed is 910 tons per year. Model estimates indicate that 40 tons (16.2%) are from agricultural land and that 217 tons (83.8%) has its origin from forest land. The sediment load allocated to the forest lands is 763 tons per year (910 t/yr x 0.838). The sediment load allocated to agricultural lands is 147 tons per year (910 t/yr x 0.162). The U.S. Forest Service is allocated 655 tons per year (763 t/yr x 0.858), while the private and State forest land is allocated 108 tons per year (763 t/yr x 0.142). The ranches along the stream are allocated 71 tons per year (147 t/yr x 0.485), while the ranchettes are allocated 76 tons per year (147 t/yr x 0.515).

Figure 1



3.1.7 Sediment Load Reduction Allocation

3.1.7.1 Current Sediment Yield from Forest and Agricultural Bottom Lands.

The current estimate of sediment yield from the watershed is 1,157 tons per year (section 2.3.2.8; table 15) It is estimated that 83.8% has its origin from forest land, while 16.2% has its origin from agricultural lands along the stream. The sediment load reduction sought from forest lands is 207 tons per year ([1,157 - 910] x 0.838). The sediment load reduction sought from agricultural lands is 40 tons per year ([1,157 - 910] x 0.162).

3.1.7.2 Forest Lands

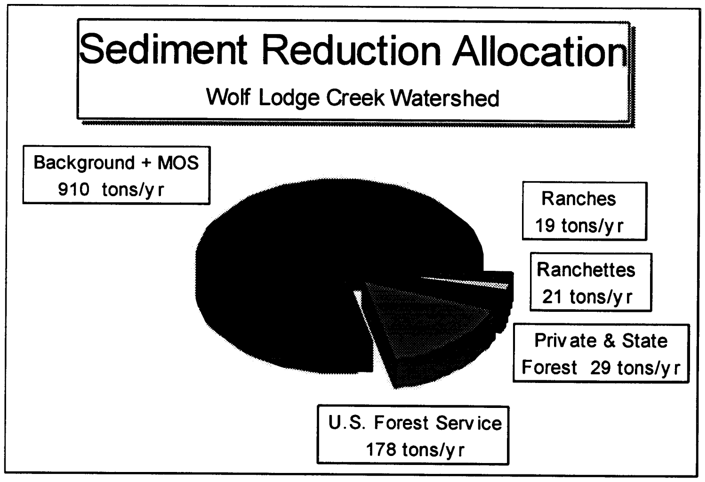
Sediment sources from forest lands are primarily associated with the road systems. Prime sediment sources are roads located in stream flood plains, road crossings of streams and erosion from road surfaces channeled directly to streams.

The U.S. Forest Service manages 85.8% of the forest lands and is allocated a sediment load reduction target of 178 tons per year (207 x 0.858) from its lands. Private and State forest owners manage 14.2% of the forest lands and are allocated a sediment load reduction target of 29 tons per year (207 x 0.142) from these lands.

3.1.7.3 Agricultural Lands

Agricultural lands or those agricultural lands converted to small ranchettes are located in the lower Marie and lower Wolf Lodge Creek areas of the watershed. Ranchettes are land holdings of a few to forty acres. The primary mechanism of sedimentation from the agricultural and converted lands is stream bank erosion. Bank erosion is the result of riparian vegetation loss and channelization on working ranch lands and ranchettes. Ranchettes are allocated a sediment load reduction of 21 tons/ year (40 x 0.515). The two ranches are allocated a sediment load reduction of 19 tons/ year (40 x 0.485).

Figure 2



3.1.8 Monitoring Provisions

In-stream monitoring of the beneficial use (cold water biota) support status during and after the sediment abatement project implementation will establish the final sediment load reduction required by the TMDL. In-stream monitoring, which will detect the thresholds values identified in section 3.1.4, will be completed every year on a randomly selected 1% of the watershed's Rosgen B and C channel types. Data will be complied after five years. The yearly increments of random testing, which sum to 5% of the stream after five years should provide a data base not biased by transit fish and macroinvertebrate population shifts. Based on this data base the beneficial use support status will be determined. Monitoring will assess stream reaches 20 times bankfull width in length. These reaches will be randomly selected from the total stream channel in B and C types until at least 5% of these channels have been assessed after five years. Identical measurements will be made in appropriate reference streams, in which beneficial uses are known to be supported.

3.1.9 Feedback Provisions

Data from which the problem assessment and TMDL for the Wolf Lodge Creek watershed were developed are often crude measurements. As more exact measurements are developed during implementation plan development or subsequent to its development these will be added to a revised TMDL as required.

When beneficial use (cold water biota) support meet the full attainment level, further sediment load reducing activities will not be required in the watershed. The interim sediment loading capacity will be replaced in a revised TMDL with the ambient sediment load. Best management practices for forest and agricultural practices will be prescribed by the revised TMDL with erosion abatement structure maintenance provisions. Regular monitoring of the beneficial use will be continued for an appropriate period to document maintenance of the full support of the beneficial use (cold water biota).

3.2. Cougar, Kidd, and Mica Creek Watersheds Sediment Total Maximum Daily Loads

3.2.1. Introduction

Cougar, Kidd, and Mica Creeks are listed as water quality limited on the 1998 section 303(d) CWA list. The sub-basin assessment (section 2.0) indicates that these creeks are impaired by excess sedimentation. Mica Creek is additionally limited by bacteria. A separate TMDL will be developed for this pollutant of Mica Creek.

Sediment model results indicate that Cougar, Kidd and Mica Creeks exceed the natural background sedimentation rate by 60, 34.3 and 80.1 tons per year, respectively. However, the sediment loading of streams in the northern Rocky Mountains is not continuous nor does it occur on a yearly basis. The majority of the sediment resident in the bed and affecting the beneficial uses is loaded in large discharge events, which have a return period of 10 - 15 years. The model accounts for this fact by dividing mass failure and road encroachment sediment estimates by ten. Cougar Creek could possibly have 600 tons of sediment resident in its bed from the 1996 flood event, while Kidd and Mica Creek would have 343 and 801 tons, repectively. These amount added to any residual sediment from the 1974 and earlier flood events.

The Cougar, Kidd and Mica Creek watersheds have the ownership pattern outlined in Table 1:

Table 1: Land ownership pattern of the Cougar and Mica Watersheds

Watershed	BLM (acres) (%)	State (acres) (%)	Private (acres) (%)
Cougar	-- (0)	423 (4)	10,229 (96)
Kidd	-- (0)	-- (0)	3,738 (100)
Mica	331 (2.2)	646 (4.3)	13,964 (93.5)

The land use pattern has the pattern outlined in Table 2a and b.

Table 2: Land use patterns of Cougar, Kidd and Mica Creeks

a) Cougar Creek

Land Use	Acreage	Percentage
State Forest	423	4.0
Private Forest	7,620	71.5
Agricultural field/pasture /ranchettes	2,609	24.5

b) Kidd Creek

Land Use	Acreage	Percentage
State Forest	0	0
Private Forest	1,965	52.6
Agricultural field/pasture /ranchettes	1,772	47.4

b) MicaCreek

Land Use	Acreage	Percentage
BLM Forest	331	2.2
State Forest	646	4.3
Private Forest	11,358	76.1
Agricultural field/pasture /ranchettes	2,606	17.4

3.2.2. TMDL Authority

Section 303(d)(1) of the Clean Water Act requires states to prepare a list of waters not meeting state water quality standards in spite of technology based pollution control efforts and the application of best management practices for nonpoint sources. This list must include a priority ranking "... taking into account severity of the pollution and the uses to be made of such waters." The prescribed remedy for these water quality limited waters is for states to determine the total maximum daily load (TMDL) for pollutants "... at a level necessary to implement applicable water quality standards with seasonal variations and a margin of safety ..." A margin of safety is included to account for any lack of knowledge about how limiting pollutant loads will attain water quality.

Section 303(d)(2) requires both the list and any total maximum daily loads developed by the state be submitted to the Environmental Protection Agency (EPA). The EPA is given thirty days to either approve or disapprove the state's submission. If the EPA disapproves, the agency has another thirty days to develop a list or TMDL for the state. Both the list and all TMDLs, either approved or developed by EPA, are incorporated into the state's continuing planning process as called for in section 303(e).

3.2.3 Loading Capacity

The load capacity of a TMDL designed to address a sediment caused limitation to water quality is complicated by the fact that the State's water quality standard is a narrative rather than quantitative criterion. In the waters of the Cougar and Mica Creeks watersheds, the sediment interfering with the beneficial use (cold water biota) is primarily moderate to fine grain sands. Quantitative measurements of the impact of excess sediment have not been developed. Given this difficulty a sediment loading capacity for the TMDL is more difficult to develop. The load capacity used in this TMDL is based on the following premises:

: background levels of sedimentation are assumed to be fully supportive of the beneficial use, cold water biota.

: the stream system has some finite yet unquantified ability to process (attenuate) a sedimentation rate greater than background rates.

: the beneficial use (cold water biota) in-stream will respond to a level of full support, which can be quantified when the finite yet unquantified ability of the stream system to process (attenuate) sediment is met.

: care must be taken to control factors which may interfere (fish harvest) with the quantification of beneficial use support.

The background sedimentation rates for Cougar, Kidd and Mica Creeks watersheds are provided in Table 3.

Table 3: Background sedimentation rate and interim loading capacity and margin of safety application

Water body	Acres	Sediment load capacity (tons/year)	Modeled sediment yield to stream (tons/yr)
Cougar	10,711	407	467.0
Kidd	3,738	142	176.3
Mica	14,941	568	648.1

The natural background sediment rates are the interim loading capacities for the three watersheds..

3.2.4. Margin of Safety

The model employed to estimate sedimentation rates has several conservative assumptions, which are documented in Section 2.0, Appendix B. Applied to the Kaniksu granetic terrane of the Cougar, Kidd and Mica watersheds, the model provides an inherit margin of safety of 164%. This is a sufficient margin of safety.

3.2.5. Appropriate Measurements of Full Beneficial Use Support

Sediment load reduction from the current level towards the interim sediment reduction goal is expected to attain an as yet unquantified sediment load at which the beneficial use (cold water biota) will attain full support. This sediment load will be recognized by the following appropriate measures of full cold water biota support:

: three or more age classes of trout with one young of the year.
: trout density at reference levels 0.1 - 0.3 trout per square meter [1].
: presence of sculpin..
: macro invertebrate biotic index score of 3.5 or greater.

When the appropriate sediment loading capacity is determined by these appropriate measures of full cold water biota support, the interim load capacity will be revised to the appropriate load capacity.

3.2.6. Sediment Load Allocation

The current estimate of allocatable sediment load capacity of the watershed is provided in table 4. The sediment loads allocated to the forest lands and to agricultural/residential lands based on the acreage values of Table 2 are provided in Table 4.

Table 4: Allocation of sediment load capacity between land uses in the Cougar, Kidd and Mica Creeks Watersheds

Water body	Sediment load allocated to Forest Lands (tons/yr)	Sediment Load allocated to agricultural/residential lands (tons/yr)
Cougar	307	100
Kidd	75	67
Mica	469	99

Forest Land can be further subdivided into federal, state and private forest land. The further allocation of sediment load capacity to these land uses is provided in Table 5 and figure 1 based on acreage provided in Tables 1 and 2.

Table 5: Allocation of sediment load capacity based on subdivision of land use types.

Water body	Cougar	Kidd	Mica
BLM forest (tons/yr)	-	-	13
State forest (tons/yr)	16	-	24
Private forest (tons/yr)	291	75	432
Agriculture (tons/yr)	100	67	

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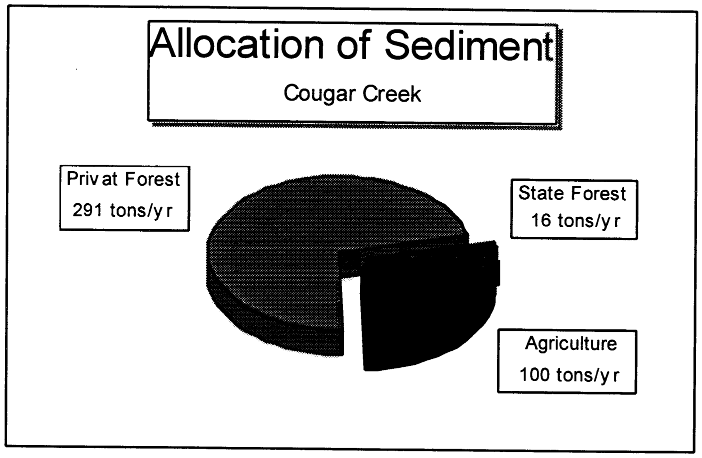
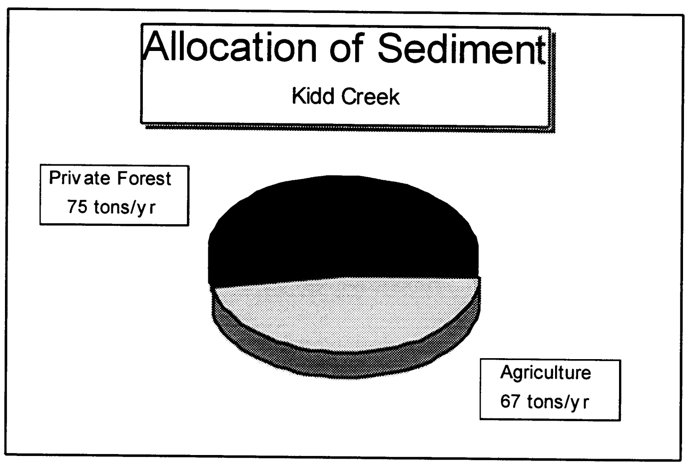
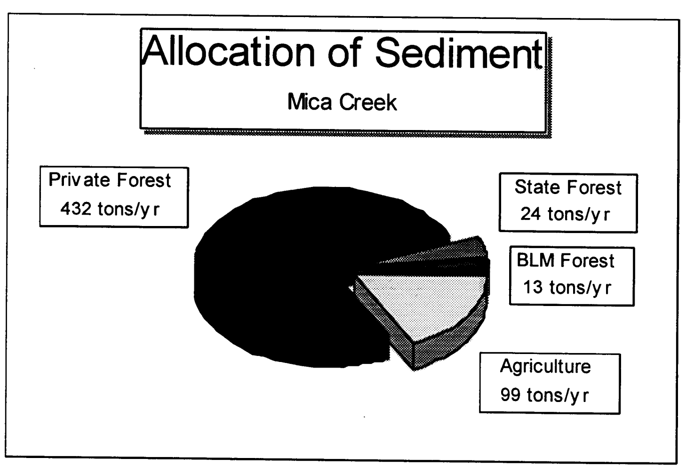
[1] Reference streams, Two Mouth and Trapper Creeks above development.

Figure 1







3.2.7. Sediment Load Reduction Allocation

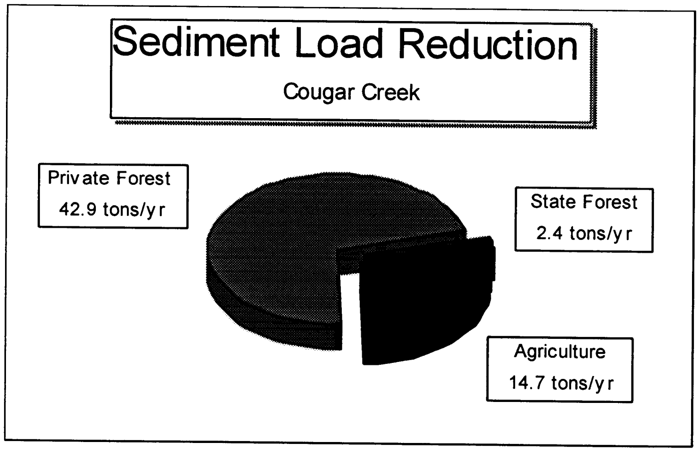
3.2.7.1. Current Sediment Yield from Forest and Agricultural Bottom Lands.

The current estimate of sediment yield from each watershed is provided in Table 3. Based on the acreage values provided in Tables 1 and 2, the sediment load reduction required of each land use is provided in Table 6 and Figure 2.

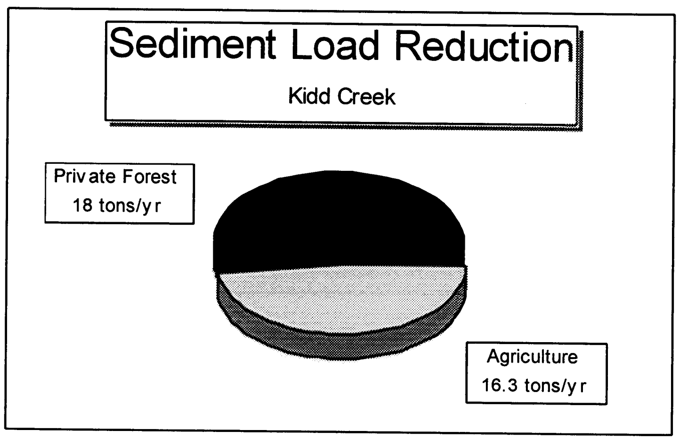
Table 6: Allocation of sediment load reduction required of each land use type.

Water body	Cougar	Kidd	Mica
BLM forest (tons/yr)	-	-	1.8
State forest (tons/yr)	2.4	-	3.5
Private forest (tons/yr)	42.9	18.0	60.9
Agriculture (tons/yr)	14.7	16.3	13.9

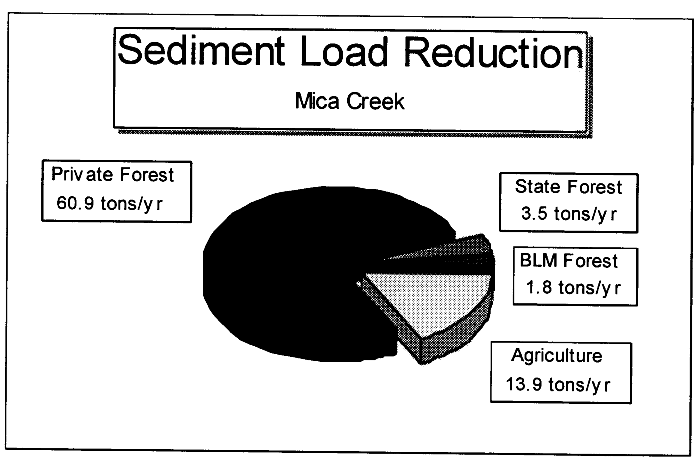
Figure 2



Sediment Load Reduction
Cougar Creek
Private Forest
42.9 tons/yr
State Forest
2.4 tons/yr
Agriculture
14.7 tons/yr



Sediment Load Reduction
Kidd Creek
Private Forest
18 tons/yr
Agriculture
16.3 tons/yr



Sediment Load Reduction
Mica Creek
Private Forest
60.9 tons/yr
State Forest
3.5 tons/yr
BLM Forest
1.8 tons/yr
Agriculture
13.9 tons/yr

3.2.7.2. Forest Lands

Sediment sources on forest lands are primarily associated with the road systems. Prime sediment sources are roads located in stream flood plains, road crossings of streams and erosion from road surfaces channeled directly to streams.

3.2.7.3. Agricultural Lands

Agricultural lands or those agricultural lands converted to small ranchettes are located in the Cougar Creek watershed. Ranchettes are land holdings of a few to forty acres. The primary mechanism of sedimentation from the agricultural and converted lands is stream bank erosion along these streams. Bank erosion is the result of riparian vegetation loss and channelization on working ranch lands and ranchettes.

3.2.8. Monitoring Provisions

In-stream monitoring of the beneficial use (cold water biota) support status during and after the sediment abatement project implementation will establish the final sediment load reduction required by the TMDL. In-stream monitoring, which will detect the thresholds values identified in section 3.2.4, will be completed every year on a randomly selected 1% of the watershed's Rosgen B and C channel types. Data will be complied after five years. The yearly increments of random testing, which sum to 5% of the stream after five years should provide a data base not biased by transit fish and macroinvertebrate population shifts. Based on this data base the beneficial use support status will be determined. Monitoring will assess stream reaches 20 times bankfull width in length. These reaches will be randomly selected from the total stream channel in B and C types until at least 5% of these channels have been assessed after five years. Identical measurements will be made in appropriate reference streams, in which beneficial uses are known to be supported.

3.2.9 Feedback Provisions

Data from which the problem assessment and TMDL for the Cougar, Kidd and Mica Creeks watersheds were developed are often crude measurements. As more exact measurements are developed during implementation plan development or subsequent to its development these will be added to a revised TMDL as required.

When the appropriate measurements of beneficial use (cold water biota) support status meet the full attainment level, further sediment load reducing activities will not be required in the watershed. The interim sediment loading capacity will be replaced in a revised TMDL with the ambient sediment load. Best management practices for forest and agricultural practices will be prescribed by the revised TMDL with erosion abatement structure maintenance provisions. Regular monitoring of the beneficial use will be continued for an appropriate period to document maintenance of the full support of the beneficial use (cold water biota).

3.3. Latour Creek Watershed Sediment Total Maximum Daily Loads

3.3.1 Introduction

Latour, Larch, and Baldy Creeks are listed as water quality limited on the 1998 section 303(d) CWA list for sediment. The sub-basin assessment (section 2.0) indicates that Latour Creek is impaired by excess sedimentation, while this does not appear to be the case for Baldy and Larch Creeks. A sediment TMDL addressing Latour Creek will of necessity address Baldy and Larch Creeks.

The model used estimated 126 tons/year above the background sedimentation rate. However, the sediment loading of streams in the northern Rocky Mountains is not continuous nor does it occur on a yearly basis. The majority of the sediment resident in the bed and affecting the beneficial uses is loaded in large discharge events which have a return period of 10 - 15 years. The model accounts for this fact by dividing mass failure and road encroachment sediment estimates by ten. Latour Creek could possibly have 1,260 tons of sediment resident in its bed from the 1996 flood event. This amount added to any residual sediment from the 1974 and earlier flood events.

The Latour Creek watershed has the ownership and land use pattern outlined in Table 1:

Table 1: Land use patterns of Latour Creek

Land Use	Acreage	Percentage
BLM forest	8,370	25.1 (25.3)
Forest Service forest	1,117	3.3 (3.4)
Tribal forest	1,078	3.2 (3.3)
State Forest	8,427	25.4 (25.4)
Private Forest	14,109	42.3 (42.6)
Ag/ Residential subdivision	257	0.8

Note: Values in parenthesis are percentage of forest land.

3.3.2 TMDL Authority

Section 303(d)(1) of the Clean Water Act requires states to prepare a list of waters not meeting state water quality standards in spite of technology based pollution control efforts and the application of best management practices for nonpoint sources. This list must include a priority ranking "... taking into account severity of the pollution and the uses to be made of such waters." The prescribed remedy for these water quality limited waters is for states to determine the total maximum daily load (TMDL) for pollutants "... at a level necessary to implement applicable water quality standards with seasonal variations and a margin of safety ..." A margin of safety is included to account for any lack of knowledge about how limiting pollutant loads will attain water quality.

Section 303(d)(2) requires both the list and any total maximum daily loads developed by the state be submitted to the Environmental Protection Agency (EPA). The EPA is given thirty days to either approve or disapprove the state's submission. If the EPA disapproves, the agency has another thirty days to develop a list or TMDL for the state. Both the list and all TMDLs, either approved or developed by EPA, are incorporated into the state's continuing planning process as called for in section 303(e).

3.1.3. Loading Capacity

The load capacity for a TMDL designed to address a sediment caused limitation to water quality is complicated by the fact that the State's water quality standard is a narrative rather than quantitative standard. In the waters of the Latour Creek watershed, the sediment interfering with the beneficial use (cold water biota) is most likely large bedload particles. Adequate quantitative measurements of the effect of excess sediment have not been developed. Given this difficulty a sediment loading capacity for the TMDL is more difficult to develop. This TMDL and its loading capacity is based on the following premises:

: natural background levels of sedimentation are assumed to be fully supportive of the beneficial uses, cold water biota.

: the stream system has some finite yet unquantified ability to process (attenuate through export and/or deposition) a sedimentation rate greater than background rates.

: the beneficial use (cold water biota) in-stream will be fully supported when the finite yet unquantified ability of the stream system to process (attenuate) sediment is met.

: care must be taken to control factors which may interfere (fish harvest) with the quantification of beneficial use support.

The natural background sedimentation rate from the Latour Creek Watershed is 767 tons per year. (Background sediment yield = 33,359 acres x 0.023 tons/acre/yr). This calculation assumes the entire watershed would be vegetated by coniferous forest, if undisturbed. This value is the interim loading capacity.

3.1.4. Margin of Safety

The model employed to estimate sedimentation rates has several conservative assumptions, which are documented in Section 2.0, Appendix B. Applied to the Belt terrane of the Latour watershed, the model provides an inherit margin of safety of 231%. This is a sufficient margin of safety.

Table 2: Background sedimentation rate (interim loading capacity) and modeled sediment yield of Latour Creek

Waterbody	Acres	Background sedimentation rate (tons/year) (Acres x 0.023 tons /acre/ year)	Modeled sediment yield to stream (tons/yr)
Latour	33,359	767	893

3.3.5. Appropriate Measurements of Full Beneficial Use Support

Sediment load reduction from the current level towards the interim sediment reduction goal is expected to attain an as yet unquantified sediment load at which the beneficial use (cold water biota) will attain full support. This sediment load will be recognized by the following appropriate measures of full cold water biota support:

: three or more age classes of trout with one young of the year.
: trout density a reference levels (0.1-0.3 fish/yd^2/hour effort).
: presence of sculpin and tailed frogs.
: macro invertebrate biotic index score of 3.5 or greater.

When the appropriate sediment loading capacity is determined by these appropriate measures of full cold water biota support, the interim load capacity will be revised to the appropriate load capacity.

3.3.6. Sediment Load Allocation

The current estimate of allocatable sediment load capacity of the watershed is provided in table 2. The sediment load allocated to the forest lands and to agricultural/residential lands based on the a 90% forest and 10% agriculture/ residental lands assumption (Table 3). The agriculture/ residential lands are provided a higher allocation than would be expected from the 0.8% land base in these uses. The higher assumed allocation is based on the presence of bank erosion adjacent to these properties.

Table 3: Allocation of sediment load capacity between land uses in the Latour Creek Watershed

Waterbody	Sediment load allocated to Forest Lands (tons/yr)	Sediment Load allocated to agricultural / residential lands (tons/yr)
Latour	690	77

Forest Land can be further subdivided into Forest Service, BLM, State, Tribal and private forest land. Stream bottom pasture land is completely divided into residential (ranchette) lands. The further allocation of sediment load capacity to these land uses is provided in Table 4 and figure 1 based on acreages provided in Tables 1.

Table 4: Allocation of sediment load capacity based on subdivision of land use types.

Waterbody	Latour
Forest Service (tons/yr)	23
BLM (tons/yr)	175
Tribe (tons/yr)	23
State (tons/yr)	175
Private forest (tons/yr)	294
Ag / residential (tons/yr)	77

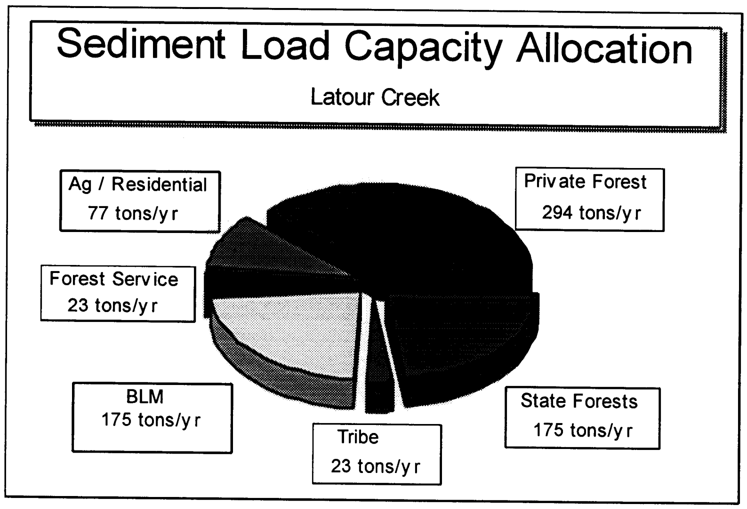


Figure 1

3.3.7. Sediment Load Reduction Allocation

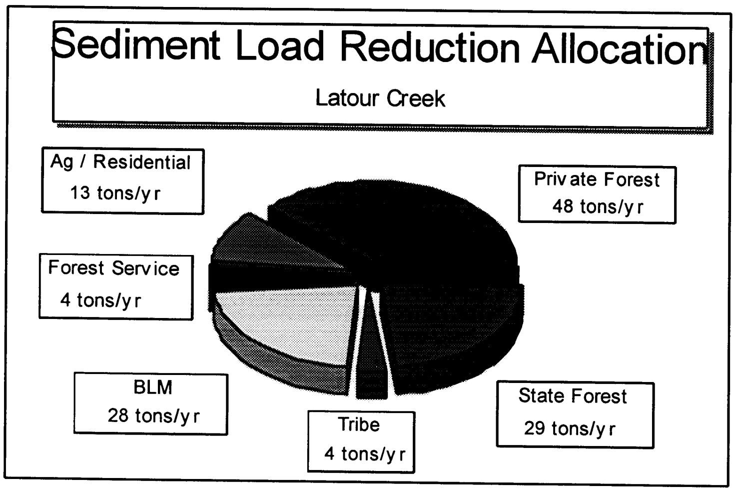
3.3.7.1. Current Sediment Yield from Forest and Agricultural Bottom Lands.

The current estimate of sediment yield for the watershed is provided in Table 2. The sediment reduction required is 126 tons per year (893 t/yr - 767 t/yr). Based on the acreage percentages provided in Tables 1, the sediment load reduction required of forest lands is 113 tons per year (126 t/yr * 0.9) and 13 tons per year (126 t/yr * 0.1) from agriculture land. The sediment reduction required of each owner group is provided in table 5 and figure 2.

Table 5: Allocation of sediment load reduction required of each land use type.

Waterbody	Cougar
Forest Service (tons/yr)	4
BLM (tons/yr)	28
Tribe (tons/yr	4
State forest (tons/yr)	29
Private forest (tons/yr)	48
Ag / residential (tons/yr)	13

Figure 2



3.3.7.2. Forest Lands

Sediment sources from forest lands are primarily associated with the road systems. Prime sediment sources are roads located in stream flood plains, road crossings of streams and erosion from road surfaces channeled directly to streams.

3.3.7.3. Agricultural Lands

Agricultural lands converted to small ranchettes are located in the Latour Creek watershed. Ranchettes are land holdings of a few to forty acres. The primary mechanism of sedimentation from the agricultural and converted lands is stream bank erosion along these streams. Bank erosion is the result of riparian vegetation loss and channelization on working ranch lands and ranchettes.

3.3.8. Monitoring Provisions

In-stream monitoring of the beneficial use (cold water biota) support status during and after the sediment abatement project implementation will establish the final sediment load reduction required by the TMDL. In-stream monitoring, which will detect the thresholds values identified in section 3.1.4, will be completed every year on a randomly selected 1% of the watershed's Rosgen B and C channel types. Data will be complied after five years. The yearly increments of random testing, which sum to 5% of the stream after five years should provide a data base not biased by transit fish and macroinvertebrate population shifts. Based on this data base the beneficial use support status will be determined. Monitoring will assess stream reaches 20 times bankfull width in length. These reaches will be randomly selected from the total stream channel in B and C types until at least 5% of these channels have been assessed after five years. Identical measurements will be made in appropriate reference streams, in which beneficial uses are known to be supported.

3.1.9. Feedback Provisions

Data from which the problem assessment and TMDL for the Latour Creek watershed were developed are often crude measurements. As more exact measurements are developed during implementation plan development or subsequent to its development these will be added to a revised TMDL as required.

When beneficial use (cold water biota) support meet the full attainment level, further sediment load reducing activities will not be required in the watershed. The interim sediment loading capacity will be replaced in a revised TMDL with the ambient sediment load. Best management practices for forest and agricultural practices will be prescribed by the revised TMDL with erosion abatement structure maintenance provisions. Regular monitoring of the beneficial use will be continued for an appropriate period to document maintenance of the full support of the beneficial use (cold water biota).

3.4 Mica Creek Watershed Bacteria Total Maximum Daily Load

3.4.1 Introduction

Mica Creek and its North Fork exceed the current fecal coliform bacteria standard for the designated use secondary contact recreation (Table 1). The current standard is a geometric mean of 200 fecal coliform per 100 ml of water over a thirty-day period. The proposed *Escherichia coli* (E-coli) standard for recreational use will be a geometric mean over a thirty-day period of 126 E-coli per 100 ml water. The TMDL is written for both standards in the event it changes in the next year.

Table 1: Fecal and E coli form bacteria from two locations on Mica Creek

Date	Mica Creek FC	Mica Creek EC	NF Mica Creek FC	NF Mica Creek EC
7/23/99	5100	2900	400	180
7/23/99		1300		200
7/27/99	570	150	600	130
7/30/99	730	630	500	380
8/4/99	800	220	720	190
8/24/99	570	300	600	300
Geometric Mean	993	535	553	216

There are no point sources discharging bacteria to Mica Creek. Potential sources of bacteria to Mica Creek are residences and grazing animals. Seven residences are located along the creek. It is unlikely that these few residences are the source of the bacteria. Three ranches and one ranchette graze livestock along the stream. These grazing animals and particularly the cattle associated with the three ranches are the likely source of the observed bacteria exceedence.

3.4.2 TMDL Authority

Section 303(d)(1) of the Clean Water Act requires states to prepare a list of waters not meeting state water quality standards in spite of technology-based pollution control efforts and best management practices applied to nonpoint sources. This list must include a priority ranking "... taking into account severity of the pollution and the uses to be made of such waters." The prescribed remedy for these water quality limited waters are for states to determine the total maximum daily load (TMDL) for pollutants "... at a level necessary to implement applicable water quality standards with seasonal variations and a margin of safety ..." A margin of safety is included to account for any lack of knowledge about how limiting pollutant loads will attain water quality.

Section 303(d)(2) requires both the list and any total maximum daily loads developed by the state be submitted to the Environmental Protection Agency (EPA). The EPA is given thirty days to either approve or disapprove the state's submission. If the EPA disapproves, the agency has another thirty days to develop a list or TMDL for the state. Both the list and all TMDLs, either approved or developed by EPA, are incorporated into the state's continuing planning process as called for in section 303(e).

3.4.3 Loading Capacity

Measured discharge on Mica Creek was 2.5 cubic feet per second (cfs), while the North Fork was measured at 1.7 cfs. These are the only measurements available. These measurements were made during August 1995. For purposes of calculation the loading capacity a mean summer discharge of 4 cfs and 2.7 cfs were assumed for Mica Creek and its North Fork, respectively. These are conservatively high summer discharge estimates.

The loading capacity was based on the most stringent chronic standards, 200 fcu/ 100 ml for fecal coliform, the current secondary contact recreation standard (IDAPA 16.01.02.250.01.b.iii) and 126 ecu/100ml for E-coli, the proposed recreational use standard. Use of these standards employs the most conservative case for load capacity calculation. Load capacity for fecal coliform and E-coli are provided in Table 2. The mathematical calculations are provided in Appendix A.

Table 2: Loading Capacity and Loading Capacity with 20% Margin of Safety Applied

Stream	fcu loading capacity (number/d)	ecu loading capacity (umber/d)	fcu loading capacity - MOS* (number/d)	ecu loading capacity - MOS* (number/d)
Mica Creek	1.96×10^{10}	1.23×10^{10}	1.57×10^{10}	$9.87 \text{ X } 10^{9}$
NF Mica Creek	1.32×10^{10}	8.32×10^{9}	1.06×10^{10}	6.66×10^{9}

* Note: MOS applied is 20%, which for these numbers would range from 1.6 to 3.9 billion coliform units.

3.4.4 Margins of Safety

Three margins of safety are constructed into the TMDL. This is necessary because a very limited amount of discharge and coliform data is available on which to base the TMDL. Since only a single set of discharge values are available the assumed flow is placed at a high summer flow for a stream likely able to support secondary contact activities. The chronic standards are employed to construct the loading capacity. This is the most stringent standards of the three available. A twenty percent margin of safety is removed from the loading capacities in order to account for the limited number of coliform observations.

3.4.5 Current Coliform Loads

Current coliform loads were developed using the geometric mean and the assumed flows provided in section 3.4.1 and 3.4.3. Current loads were estimated with the identical method as the loading capacity except the geometric means of the observed values were used (Table 3; Appendix A).

Table 3: Estimates of current coliform bacteria loads of Mica Creek and North Fork Mica Creek

Stream	Fecal Coliform/d	E coli/d
Mica Creek	9.72×10^{10}	5.41×10^{10}
NF Mica Creek	3.53×10^{10}	1.43×10^{10}

3.4.6 Coliform Reductions Required

The coliform reductions required are provided in Table 4. These values are the subtraction of the loading capacity modified for the margin of safety (Table 2) from the estimates of current coliform loads (Table 3). The resulting numbers are very large and difficult to grasp. For this reason the percentage coliform reduction is expressed.

Table 4: Estimated coliform reductions for Mica Creek and North Fork Mica Creek and the percent reductions required

Stream	Fecal Coliform/d Percent Reduction	E coli/d Percent Reduction
Mica Creek	8.15×10^{10} (83.9%)	4.42×10^{10} (81.8%)
NF Mica Creek	2.47×10^{10} (70.1%)	7.64×10^{9} (53.3%)

Bacterial contamination is from nonpoint sources. The majority of the bacterial contamination is most likely from grazing animals. The majority of these animals are on three ranches. One ranch is on the North Fork Mica Creek while the other two are below the North Fork - South Fork confluence. The entire allocation for the North Fork and the reduction required for the North Fork can be ascribed to the ranch to the west of Highway 95. The additional reductions required for Mica Creek would come from the ranches to the east of the highway and the small amount of stock on the single ranchette.

3.3.7 Monitoring Provisions

In-stream monitoring of the fecal coliform and E coli will be conducted after bacteria abatement project implementation. In-stream monitoring which should detect the bacteria reductions required in section 3.4.6 will be completed every two years at points of compliance at the Loff's

Bay Road Bridge and the Highway 95 Bridge. Two sample sets will be collected during the low discharge (summer) period. A sampling set will include at a minimum five integrated samples over a two week period. From these data geometric means can be developed.

3.4.8 Feedback Provisions

Data, from which the problem assessment and Mica Creek bacteria TMDL was developed, are often limited measurements. If more measurements are made during implementation plan development or subsequently to its development. These data will be used to revised the TMDL as required.

When the coliform levels meet the appropriate standard and bacteria reduction, further bacteria load reducing activities will not be required in the watershed. Best management practices for agricultural practices will be prescribed by the revised TMDL with structure maintenance provisions. Regular monitoring of the bacteria levels will be continued for an appropriate period to establish maintenance of the full support of the coliform standard.